

REMARKS

The present application was filed on October 17, 2003 with claims 1-25. In response to a Restriction Requirement dated November 3, 2004, claims 17-21 were withdrawn from consideration. In the outstanding Office Action dated December 20, 2004, the Examiner has: (i) rejected claims 1-3, 7, 10-12, 14, 22 and 23 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,548,863 to Patti (hereinafter “Patti”); (ii) rejected claims 1-4, 7, 10-12, 14-16 and 22-24 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Publication No. US 2004/0222461 to Peyre-Lavigne et al. (hereinafter “Peyre-Lavigne”); (iii) rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Peyre-Lavigne, in view of U.S. Patent No. 6,787,872 to Kinzer et al. (hereinafter “Kinzer”); (iv) rejected claims 5, 6 and 25 under 35 U.S.C. §103(a) as being unpatentable over either Patti or Peyre-Lavigne, in view of U.S. Patent No. 5,918,137 to Ng et al. (hereinafter “Ng”); and (iv) indicated that claims 8 and 9 are allowable.

In this response, claims 17-21 have been canceled without prejudice as being directed to a non-elected invention. Furthermore, claim 8 was canceled, claims 1, 9 and 22 have been amended, and claims 26-29 have been added. Applicants respectfully request reconsideration of the present application in view of the above amendments and the following remarks.

Claims 1-3, 7, 10-12, 14, 22 and 23 stand rejected under 35 U.S.C. §102(e) as being anticipated by the Patti reference. Regarding independent claims 1 and 22, which are of similar scope, the Examiner contends that Patti, in figure 1, discloses an LDMOS device including all of the elements set forth in the subject claims (Office Action; page 3, first paragraph). While Applicants respectfully disagree with this contention, claims 1 and 22 have been amended to incorporate a feature set forth in claim 8, which was indicated by the Examiner as being allowable. Specifically, claims 1 and 22 have been amended to further define the at least one trench as including “an insulating material substantially lining sidewalls forming the trench, the trench being substantially filled with an electrically conductive material.” The prior art of record fails to teach or suggest at least this additional feature of the subject claims, as acknowledged by the Examiner (Office Action; page 7, first paragraph).

For at least the reasons given above, Applicants assert that claims 1 and 22 are believed to be patentable over the prior art. Accordingly, favorable reconsideration and allowance of these claims are respectfully solicited.

With regard to claims 2, 3, 7, 10-12 and 14, which depend from claim 1, and claim 23, which depends from claim 22, Applicants submit that these claims are also patentable over the prior art of record by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons given above. Moreover, one or more of these claims define additional patentable subject matter in their own right. Accordingly, favorable reconsideration and allowance of claims 2, 3, 7, 10-12, 14 and 23 are respectfully requested.

Claims 1-4, 7, 10-12, 14-16 and 22-24 stand rejected under §102(e) as being anticipated by Peyre-Lavigne. Regarding independent claims 1 and 22, the Examiner contends that Peyre-Lavigne, in figure 6, teaches an LDMOS device including all of the elements set forth in the subject claims (Office Action; page 4, paragraph 2). While Applicants respectfully disagree with this contention, claims 1 and 22 have been amended to incorporate a feature set forth in claim 8, which was indicated by the Examiner as being allowable. Specifically, claims 1 and 22 have been amended to further define the at least one trench as including “an insulating material substantially lining sidewalls forming the trench, the trench being substantially filled with an electrically conductive material.” The prior art fails to teach or suggest at least this additional feature of the subject claims.

For at least the reasons given above, Applicants assert that claims 1 and 22 are believed to be patentable over the prior art. Accordingly, favorable reconsideration and allowance of these claims are respectfully solicited.

With regard to claims 2-4, 7, 10-12 and 14-16, which depend from claim 1, and claims 23 and 24, which depend from claim 22, Applicants submit that these claims are also patentable over the prior art of record by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons given above. Moreover, one or more of these claims define additional patentable subject matter in their own right. Accordingly, favorable reconsideration and allowance of claims 2, 3, 7, 10-12, 14 and 23 are respectfully requested.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Peyre-Lavigne, in view of Kinzer. Specifically, the Examiner acknowledges that Peyre-Lavigne fails to explicitly

teach that the trench comprises a v-groove, but contends that Kinzer teaches such arrangement. While Applicants respectfully disagree the Kinzer supplements the deficiencies of Peyre-Lavigne, Applicants submit that claim 13 is patentable over the prior art by virtue of its dependency from claim 1, which is believed to be patentable for at least the reasons given above. Accordingly, favorable reconsideration and allowance of claim 13 is respectfully requested.

Claims 5, 6 and 25 stand rejected under §103(a) as being unpatentable over either Patti or Peyre-Lavigne, in view of Ng. Specifically, the Examiner acknowledges that neither Patti nor Peyre-Lavigne disclose a shielding structure, as set forth in the subject claims. However, the Examiner contends that Ng discloses such a feature. Again, while Applicants respectfully disagree that Ng supplements the deficiencies of Patti and Peyre-Lavigne, Applicants assert that claims 5 and 6, which depend from claim 1, and claim 25, which depends from claim 22, are patentable over the prior art by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons given above. Moreover, one or more of these claims define additional patentable subject matter in their own right. Accordingly, favorable reconsideration and allowance of claims 5, 6 and 25 are respectfully solicited.

Newly presented claims 26 and 27, which depend from claim 1, and claim 28, which depends from claim 22, are believed to be patentable over the prior art by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons given above. Moreover, one or more of these claims define additional patentable subject matter in their own right. For example, claim 26 requires that the first and second trenches be “configured so as to control a curvature of the channel region” (emphasis added). Support for this limitation can be found in the present specification, for example on page 10, lines 22-23. The prior art of record fails to teach or suggest at least this additional feature of the claimed invention.

Newly presented claim 29 is also believed to be patentable over the prior art. Specifically, independent claim 29 requires “a plurality of electrically conductive trenches formed in the second layer between the gate and the second source/drain region, the trenches being formed proximate the upper surface of the semiconductor layer and extending substantially vertically through the second layer to the substrate, the trenches being spaced apart relative to one another and to a channel region formed in the device below at least a portion of the gate and between the first and second

source/drain regions, the trenches being configured so as to control a curvature of the channel region” (emphasis added). As previously stated, the prior art of record fails to teach or suggest at least this feature of the claimed invention.

While Peyre-Lavigne may disclose forming a plurality of “additional regions” in an epitaxial layer of an LDMOS device, which the Examiner analogizes to the conductive trenches recited in the subject claims, these additional regions are merely intended to reduce a maximum electric field in the epitaxial layer of the device, and are thus functionally distinguishable from the conductive trenches set forth in claim 29. Specifically, Peyre-Lavigne, at page 2, paragraph [0024], states:

The additional regions 24 form junctions where the electric field is decreased when an electric path passes between the conductive regions, e.g., source region 4 and drain region 8. Thus, the electric field across the entire drift region between the source region 4 and the drain region 8 is divided by each junction formed by each P-doped additional region 24.

Peyre-Lavigne fails to teach or suggest configuring the plurality of conductive trenches so as to control a curvature of the channel region, as recited in claim 29. Likewise, Patti discloses a plurality of “separating regions 16, 17” (Patti; column 2, lines 57-60), but fails to teach or suggest a plurality of conductive trenches configured so as to control a curvature of the channel region.

For at least the above reasons, Applicants submit that claims 26-29 are also patentable over the prior art. Accordingly, favorable consideration and allowance of claims 26-29 are respectfully requested.

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In view of the foregoing, Applicants believe that claims 1-7, 9-16 and 22-29, which are currently pending in the application, are in condition for allowance, and respectfully request withdrawal of the §102 and §103 rejections.

Respectfully submitted,



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Wayne L. Ellenbogen  
Attorney for Applicant(s)  
Reg. No. 43,602  
Ryan, Mason & Lewis, LLP  
90 Forest Avenue  
Locust Valley, NY 11560  
(516) 759-7662